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# 1 Fast implementations of secret-key block ciphers using mixed inner- and outer-round


[pipelining](#)

Pawel Chodowiec, Po Khuon, Kris Gaj

 February 2001 **Proceedings of the 2001 ACM/SIGDA ninth international symposium on Field programmable gate arrays**

Publisher: ACM Press

Full text available: pdf(691.29 KB)

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The new design methodology for secret-key block ciphers, based on introducing an optimum number of pipeline stages inside of a cipher round is presented and evaluated. This methodology is applied to five well-known modern ciphers, Triple DES, Rijndael, RC6, Serpent, and Twofish, with the goal to first obtain the architecture with the optimum throughput to area ratio, and then the architecture with the highest possible throughput. All ciphers are modeled in VHDL, and implemented using Xilinx ...

**Keywords:** AES, fast architectures, pipelining, secret-key ciphers

# 2 An FPGA implementation and performance evaluation of the Serpent block cipher



A. J. Elbirt, C. Paar

 February 2000 **Proceedings of the 2000 ACM/SIGDA eighth international symposium on Field programmable gate arrays**

Publisher: ACM Press

Full text available: pdf(674.09 KB)

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With the expiration of the Data Encryption Standard (DES) in 1998, the Advanced Encryption Standard (AES) development process is well underway. It is hoped that the result of the AES process will be the specification of a new non-classified encryption algorithm that will have the global acceptance achieved by DES as well as the capability of long-term protection of sensitive information. The technical analysis used in determining which of the potential AES candidates will be selected as the ...

**Keywords:** FPGA, VHDL, algorithm-agility, block cipher, cryptography

# 3 Architectural support for fast symmetric-key cryptography



Jerome Burke, John McDonald, Todd Austin

 November 2000 **ACM SIGOPS Operating Systems Review , ACM SIGARCH Computer Architecture News , Proceedings of the ninth international conference**

**on Architectural support for programming languages and operating systems ASPLOS-IX**, Volume 34 , 28 Issue 5 , 5

**Publisher:** ACM Press

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The emergence of the Internet as a trusted medium for commerce and communication has made cryptography an essential component of modern information systems. Cryptography provides the mechanisms necessary to implement accountability, accuracy, and confidentiality in communication. As demands for secure communication bandwidth grow, efficient cryptographic processing will become increasingly vital to good system performance. In this paper, we explore techniques to improve the performance of symmetric ...

**4** CryptoManiac: a fast flexible architecture for secure communication



Lisa Wu, Chris Weaver, Todd Austin

May 2001 **ACM SIGARCH Computer Architecture News , Proceedings of the 28th annual international symposium on Computer architecture ISCA '01**, Volume 29 Issue 2

**Publisher:** ACM Press

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*The growth of the Internet as a vehicle for secure communication and electronic commerce has brought cryptographic processing performance to the forefront of high throughput system design. This trend will be further underscored with the widespread adoption of secure protocols such as secure IP (IPSEC) and virtual private networks (VPNs).*

*In this paper, we introduce the CryptoManiac processor, a fast and flexible co-processor for cryptographic workloads. Our design is extreme ...*

**5** Concurrent error detection of fault-based side-channel cryptanalysis of 128-bit symmetric block ciphers



Ramesh Karri, Kaijie Wu, Piyush Mishra, Yongkook Kim

June 2001 **Proceedings of the 38th conference on Design automation**

**Publisher:** ACM Press

Full text available:  pdf(260.32 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Fault-based side channel cryptanalysis is very effective against symmetric and asymmetric encryption algorithms. Although straightforward hardware and time redundancy based concurrent error detection (CED) architectures can be used to thwart such attacks, they entail significant overhead (either area or performance). In this paper we investigate systematic approaches to low-cost, low-latency CED for symmetric encryption algorithms based on the inverse relationship that exists between encryp ...

**6** The year of DSC



Dennis Fowler

December 2000 **netWorker**, Volume 4 Issue 4

**Publisher:** ACM Press

Full text available:  pdf(168.12 KB)  html(20.08 KB) Additional Information: [full citation](#), [index terms](#)

**7** Quality of security service



Cynthia Irvine, Timothy Levin

February 2001 **Proceedings of the 2000 workshop on New security paradigms**

**Publisher:** ACM Press

Full text available:  pdf(684.54 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** quality of security service, quality of service, security range, variant security

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## 7. High-speed VLSI architectures for the AES algorithm



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<a href="#">10040087</a>	Not Issued	30	04/15/2002	Method and apparatus for high speed implementation of data encryption and decryption utilizing, e.g. Rijndael or its subset AES, or other encryption/decryption algorithms having similar key expansion data flow	VAN BUER, DARREL J.
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